

# 4.2

## Congruence and Triangles

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- Goals**
- Identify congruent figures and corresponding parts.
  - Prove that two triangles are congruent.

### VOCABULARY

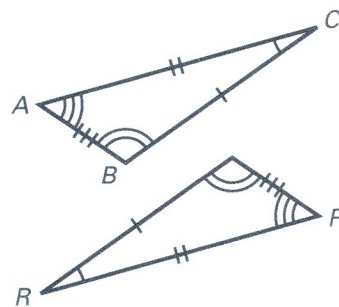
Congruent

Corresponding angles

Corresponding sides

### Example 1 Naming Congruent Parts

Write a congruence statement for the triangles. Identify all pairs of congruent corresponding parts.



### Solution

The diagram indicates that  $\triangle ABC \cong \triangle RQP$ .

The congruent angles and sides are as follows.

Angles:  $\angle A \cong \angle R$ ,  $\angle B \cong \angle Q$ ,  $\angle C \cong \angle P$

Sides:  $AC \cong RP$ ,  $BC \cong QP$ ,  $AB \cong RQ$

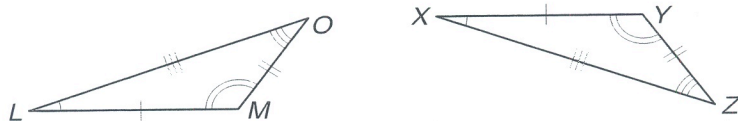
## Study Guide

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### Congruent Triangles

When two figures have exactly the same shape and size, they are said to be congruent. For two congruent triangles there are three pairs of corresponding (matching) sides and three pairs of corresponding angles. To write a correspondence statement about congruent triangles, you should name corresponding angles in the same order. Remember that congruent parts are marked by identical markings.

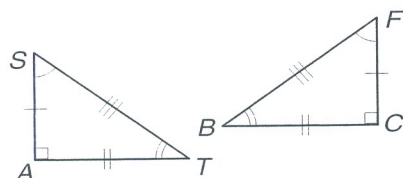
**Example:** Write a correspondence statement for the triangles in the diagram.



$$\triangle LMO \cong \triangle XYZ$$

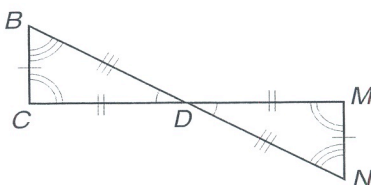
Complete each correspondence statement.

1.



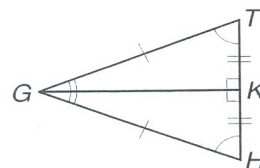
$$\triangle SAT \cong \triangle ?$$

2.



$$\triangle BCD \cong \triangle ?$$

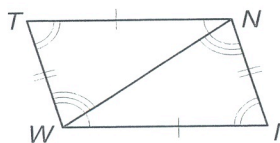
3.



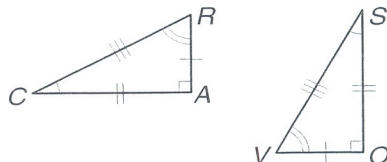
$$\triangle GHK \cong \triangle ?$$

Write a congruence statement for each pair of congruent triangles.

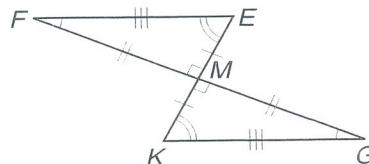
4.



5.



6.



Draw triangles  $\triangle EDG$  and  $\triangle QRS$ . Label the corresponding parts if  $\triangle EDG \cong \triangle QRS$ . Then complete each statement.

7.  $\angle E \cong ?$

8.  $\overline{DG} \cong ?$

9.  $\angle EDG \cong ?$

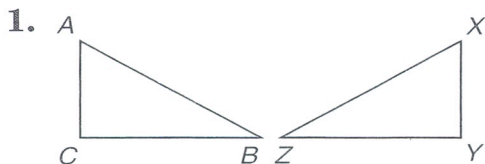
10.  $\overline{GE} \cong ?$

11.  $\overline{ED} \cong ?$

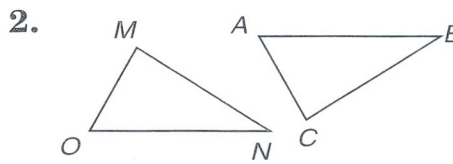
12.  $\angle EGD \cong ?$

# Congruent Triangles

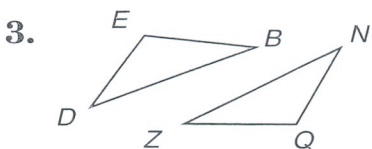
Name the congruent angles and sides for each pair of congruent triangles. Then draw arcs and slash marks to show the congruent angles and sides.



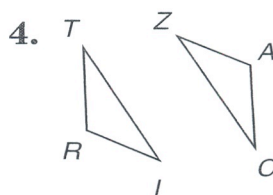
$$\triangle ACE \cong \triangle XYZ$$



$$\triangle MNO \cong \triangle CBA$$

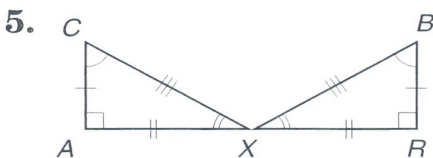


$$\triangle BDE \cong \triangle ZNQ$$

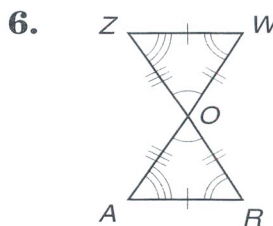


$$\triangle TRI \cong \triangle ZAC$$

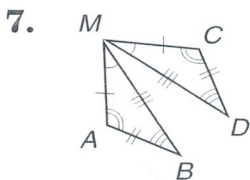
Complete each congruence statement.



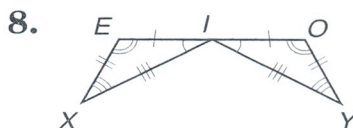
$$\triangle CAX \cong \triangle \underline{\hspace{1cm}} ?$$



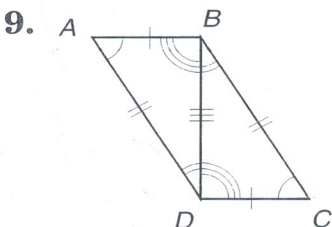
$$\triangle ZWO \cong \triangle \underline{\hspace{1cm}} ?$$



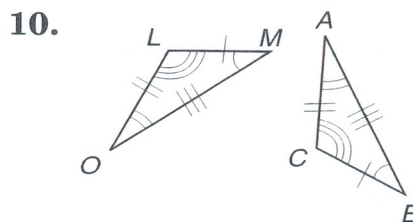
$$\triangle MAB \cong \triangle \underline{\hspace{1cm}} ?$$



$$\triangle EIX \cong \triangle \underline{\hspace{1cm}} ?$$



$$\triangle ABD \cong \triangle \underline{\hspace{1cm}} ?$$



$$\triangle LMO \cong \triangle \underline{\hspace{1cm}} ?$$

## Practice

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### Congruent Triangles

If  $\triangle RST \cong \triangle ABC$ , use arcs and slash marks to show the congruent angles and sides. Complete each congruence statement.

1.  $\angle C \cong$  ?

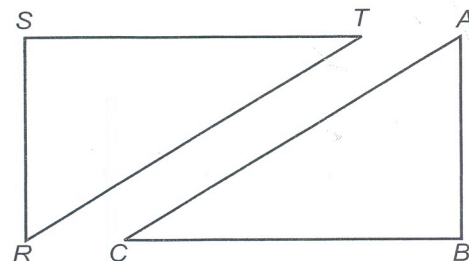
2.  $\angle R \cong$  ?

3.  $\overline{AC} \cong$  ?

4.  $\overline{ST} \cong$  ?

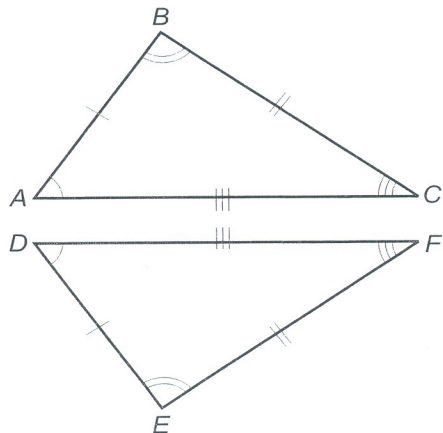
5.  $\overline{RS} \cong$  ?

6.  $\angle B \cong$  ?



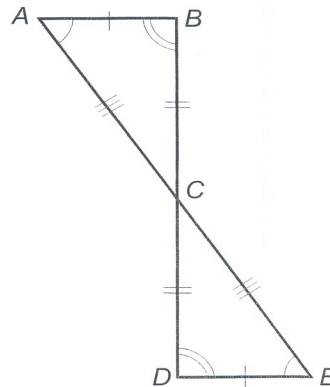
Complete each congruence statement.

7.



$\triangle ABC \cong \triangle$  ?

8.



$\triangle ACB \cong \triangle$  ?

9. Given  $\triangle ABC \cong \triangle DEF$ ,  $AB = 15$ ,  $BC = 20$ ,  $AC = 25$ , and  $FE = 3x - 7$ , find  $x$ .

10. Given  $\triangle ABC \cong \triangle DEF$ ,  $DE = 10$ ,  $EF = 13$ ,  $DF = 16$ , and  $AC = 4x - 8$ , find  $x$ .